US Army Corps
of Engineers
HUNTSVILLE DIVISION

DRAFT

Defense Environmental Restoration Program
for
Formerly Used Defense Sites

Ordnance and Explosives
Chemical Warfare Materials

ARCHIVES SEARCH REPORT

CONCLUSIONS AND RECOMMENDATIONS

MONOMOY ISLAND ARMY/AIR FORCE GUNNERY RANGE

Monomoy Island, Massachusetts
Barnstable County

Project No. D01MA024501

SEPTEMBER 1995

Prepared by
US ARMY CORPS OF ENGINEERS
ST. LOUIS DISTRICT

ORDNANCE AND EXPLOSIVES
CHEMICAL WARFARE MATERIALS
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CONCLUSIONS AND RECOMMENDATIONS
FOR
MONOMOY ISLAND ARMY/AIR FORCE GUNNERY RANGE
MONOMOY ISLAND, MASSACHUSETTS
BARNSTABLE COUNTY

PROJECT NO. D01MA024501

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1.0 Introduction

1.1 Authority

In 1980, Congress enacted the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) 42 USC 9601 et seq. Ordnance and Explosive Waste are included in the CERCLA definition of pollutants and contaminants that require a remedial response.

In 1983, the Environmental Restoration Defense Account (ERDA) was established by Public Law 98-212. This Congressionally directed fund was to be used for environmental restoration at Department of Defense (DoD) active installations and formerly used properties. The DoD designated the Army as the sole manager for environmental restoration at closed installations and formerly used properties. The Secretary of the Army assigned this mission to the Corps of Engineers (USACE) in 1984.

The 1986 Superfund Amendments and Reauthorization Act (SARA) amended certain aspects of CERCLA, some of which directly related to OEW contamination. Chapter 160 of the SARA established the Defense Environmental Restoration Program (DERP). One of the goals specified for the DERP is "correction of environmental damage (such as detection and disposal of unexploded ordnance) which creates an imminent and substantial endangerment to the public health or welfare or to the environment."

The DERP requires that a CERCLA response action be undertaken whenever such "imminent and substantial endangerment" is found on:

> A. A facility or site that is owned by, leased to, or otherwise possessed by the United States and under the jurisdiction of the Secretary of Defense.

B. A facility or site that was under the jurisdiction of the Secretary of Defense and owned by, leased to, or otherwise possessed by the United States at the time of actions leading to contamination.

C. A vessel owned or operated by the Department of Defense.

The National Contingency Plan (NCP) was established by the Clean Water Act of 1972. The NCP has been revised and broadened several times since then. Its purpose is to provide the organizational structure and procedures for remedial actions to be taken in response to the presence of hazardous substances, pollutants, and contaminants at a site. Section 105 of the 1980 CERCLA states that the NCP shall apply to all response actions taken as a result of CERCLA requirements.

The March 1990 National Oil and Hazardous Substances Pollution Contingency Plan given in 40 CFR part 300 is the latest version of the NCP. Paragraph 300.120 states that "DoD will be the removal response authority with respect to incidents involving DoD military weapons and munitions under the jurisdiction, custody, and control of DoD."

On April 5, 1990, U.S. Army Engineer Division, Huntsville (USAEDH) was designated as the USACE Mandatory Center of Expertise (MCX) and Design Center for Ordnance and Explosive Waste (OEW). As the MCX and Design Center for OEW, USAEDH is responsible for the design and successful implementation of all Department of the Army OEW remediations required by CERCLA. USAEDH will also design and implement OEW remediation programs for other branches of the Department of Defense when requested. In cooperation with the Huntsville Division the U.S. Army Corps of Engineers, St. Louis District has been assigned the task of preparing Archives Search Reports for those Formerly Used Defense Sites (FUDS) suspected of ordnance and explosive waste (OEW) and chemical warfare materials (CWM) contamination.

1.2 Subject

Monomoy Island Army/Air Force Gunnery Range, Project No. D01MA025401, located in Barnstable County, MA was used by the Army Airforce for bombing and gunnery practice between 1944 and 1950. Documentation regarding the amounts and types of ordnance used on the range was not located. It is most likely that .50-caliber and 100-lb practice bombs were used. The island was searched in both 1950 and 1951 and was cleared of any dangerous material. It is currently a Wildlife Refuge and the current owner wishes that no further action be taken at this site.

1.3 Purpose

This Archives Search Report (ASR) compiles information obtained through historical research at various archives and records holding facilities, interviews with individuals associated with the site or its operations, and personal visits to the site. All efforts were directed towards determining possible use or disposal of chemical warfare materials (CWM) on the site and documenting the existence of Ordnance and Explosive Waste (OEW). Particular emphasis was placed on establishing the chemical (agent), the type of munitions or container, quantities and area of disposal. Information obtained during this process was used in developing recommendations for further actions at the site.

1.4 Scope

After compiling the information at the archives and local historical societies, interviews and a site inspection were conducted.

2.0 Conclusions

2.1 Summary of Conclusions

The island was used by the Army Airforce for bombing and gunnery practice. The circular bombing target is no longer on land, but in the Atlantic Ocean. Only two sets of steel beams which supported the gunnery targets remain. One set is currently offshore on the bay side and the other, on the ocean side, is subusurface, covered by sand. The island was recently walked by wildlife personnel. No hazards were found at this time.

2.2 Historical Site Summary

Between 1944 and 1950, Monomoy Island was used for bombing and gunnery practice, apparently by Army Air Corps (and then Air Force) crews from Westover and Otis Army Air Fields (Roscoe 1993:215-217, Cairn 1994:8). There is some disagreement in our sources as to which base, or even which branch of the military, used the site. A War Department document (1946) assigned Monomoy land to Westover Army Air Field. Roscoe wrote that both Otis and Westover, as well as Navy and Coast Guard personnel, used the island. Cairn mentions only Otis AAF. The INPR, prepared by the New England Division of the Army Corps of Engineers (1991) related that Monomoy was used "in connection with the Wellfleet, Massachusetts, Air Station," though nothing found during our research substantiates this claim. Clark (1992:64) intimated that "[d]uring World War II Monomoy served as a Navy bombing range."

We found no precise account of the types of munitions used on the range. Roscoe (1993:217), reports that the Army claimed to be using only hundred pound, sand-filled, practice bombs with a three pound black powder spotting charge. It is likely that the machine gun rounds were .50 caliber, the standard World War II rounds for aerial gunnery practice and combat.

According to Department of the Army letter of 19 February 1951, the property was searched by Ordnance personnel and "cleared of all dangerous and explosive materials reasonably possible to detect." An earlier letter (Massachusetts Fish and Wildlife 1950) speaks of an inspection of the site by Fish and Wildlife personnel and also pronounces the area to be clear of ordnance.

We found only one testimony of any ordnance materials having been recovered since the land was returned to the Commonwealth of Massachusetts. Based on the description by Mr. Ed Moses, Refuge Manager, Monomoy Island, ordnance items believed to be found were 5-lb practice bombs. These were found about 30 years ago.

2.3 Real Estate

2.3.1 Confirmed DoD Ownership

According to the INPR, the Department of Interior (DOI) acquired the Island (2700 acres) by condemnation between 1941 and 1944. By letter of permit, dated 1 November 1944, the Army acquired approximately 1357 acres for use as an Air to Ground Gunnery Range and Bombing Range. DoD relinquished the permit on 19 February 1951.

2.3.2 Potential DoD Ownership

DoD only owned that land mentioned in section 2.3.1.

2.3.3 Significant Past Ownership other than DoD

There is no significant past ownership other than DoD.

2.3.4 Present Ownership

Currently, Monomoy Island is a National Wildlife Refuge owned and maintained by the Department of Interior, U.S. Fish and Wildlife Service.

2.4 Site Inspection

On 21 June 1995, Rochelle Ross, Randy Fraser and Theresa Williams-Dye (CELMS-PM-M) and David Tajkowski (CELMS-PD-R), completed a site inspection on Monomoy Island with Ms. Sharon Ware of the Monomoy Island Wildlife Refuge.

We met with Sharon Ware who took us by boat to the Harbor Side of Monomoy Island. We first floated by the I-beams which were once part of the aerial gunnery targets. The harbor-side beams are approximately 30 feet at low tide and 40 feet at high tide from the island. GPS Reading: DG 17363 04641. We docked farther south, walked across the island to the Ocean side then north along the beach. Ms. Ware had seen the I-beams on this side last year, but they were no where to be found. They are most likely buried under the sand. The island is very dynamic. The bombing target is no longer on the island, but is out in the Atlantic Ocean. Ms. Ware was with the group who just walked the island a few weeks ago. No hazards were found then.

No hazards were found during the site inspection.

2.5 Confirmed Ordnance Presence

There have been no reports of the presence of ordnance within the past 30 years.

2.6 Potential Ordnance Presence

The last record of found ordnance was 30 years ago when Mr. Ed Moses found the 5-lb practice bombs. The island has been walked recently by refuge personnel and no hazards were found.

The island is everchanging and what was the bombing target is out in the ocean and one of the supports for the strafing targets is in the harbor. There is potential that ordnance exists in the Atlantic Ocean and in the Harbor.

2.7 Uncontaminated Areas

Considering the island's dynamics, the amount of foot traffic by refuge personnel and that no hazards have been uncovered in over 30 years, it is likely the entire island is safe from hazardous materials.

2.8 Site Information Analysis

Research disclosed two letters stating the island was free of hazards. Based on aerial photo analysis, the bombing target is in the Atlantic Ocean. No locations of ordnance disposal were visible on the photos. The site inspection didn't uncover any ordnance hazards. One set of beams for the strafing targets was visible at low tide in the harbor. The ocean side set was apparently covered by sand. The island is very dynamic and may uncover something in the future. However, the island is currently a wildlife refuge and is rarely visited by tourists.

3.0 Recommendations

3.1 Summary of Recommendations

No further action is recommended.

3.2 Preliminary Assessment Actions

Preliminary assessment actions are not necessary at this site.

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GLOSSARY AND ACRONYMS

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AAF	Army Air Field
AA	Anti-Aircraft
AEC	Army Environmental Center
AGO	Adjutant General's Office
AP	Armor Piercing
APDS	Armor Piercing Discarding Sabot
APERS	Antipersonnel
APT	Armor Piercing with Tracer
ASR	Archives Search Report
Aux	Auxiliary
BAR	Browning Automatic Rifle
BD	Base Detonating
BD/DR	Building Demolition/Debris Removal
BE	Base Ejection
BGR	Bombing and Gunnery Range
BLM	Bureau of Land Management
BRAC	Base Realignment And Closure
CADD	Computer-Aided Design/Drafting
Cal	Caliber
CBDA	Chemical and Biological Defense Agency
CBDCOM	Chemical and Biological Defense Command
CE	Corps of Engineers
CEHND	Corps of Engineers, Huntsville Division
CELMS	Corps of Engineers, St. Louis
CENED	Corps of Engineers, New England Division
CERCLA	Comprehensive Environmental Response,Compensation and Liability Act
CERFA	Community Environmental Response Facilitation Act
CFR	Code of Federal Regulations

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cfs	Cubic Feet Per Second
COE	Chief of Engineers
COMP	Composition
CTG	Cartridge
CSM	Chemical Surety Material
CSM	Command Sergeant Major
CWM	Chemical Warfare Material
CWS	Chemical Warfare Service
DA	Department of the Army
DARCOM	Development and Readiness Command
DERA	Defense Environmental Restoration Account
DERP	Defense Environmental Restoration Program
DERP-FUDS	Defense Environmental Restoration Program-Formerly Used Defense Sites
DoD	Department of Defense
DOE	Department of Energy
DOI	Department of Interior
EE/CA	Engineering Evaluation/Cost Analysis
EIS	Environmental Impact Statement
EOD	Explosives Ordnance Disposal
EPA	Environmental Protection Agency
ERDA	Environmental Restoration Defense Account
FDE	Findings and Determination of Eligibility
FFMC	Federal Farm Mortgage Corporation
FLCH	Flechette
FS	Feasibility Study
FWS	(U.S.) Fish and Wildlife Service
FUDS	Formerly Used Defense Sites
GIS	Graphic Information System

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GSA	General Services Administration
HE	High Explosive
HEAT	High Explosive Anti-Tank
HEI	High Explosive Incendiary
HEP	Plastic
HE-S	Illuminating
HTRW	Hazardous Toxic and Radioactive Waste
HTW	Hazardous and Toxic Waste
IAS	Initial Assessment Study
INPR	Inventory Project Report
IRP	Installation Restoration Program
MCX	Mandatory Center of Expertise
MG	Machine Gun
MG	Major General
mm	Millimeter
MT	Mechanical Time
MTSQ	Mechanical Time Super Quick
NARA	National Archives and Records Administration
NAS	Naval Air Station
NCDC	National Climatic Data Center
NCP	National Contingency Plan
NFS	National Forest Service
NG	National Guard
NGVD	National Geodetic Vertical Datum
NOAA	National Oceanic and Atmospheric Administration
NOFA	No Further Action
NPRC	National Personnel Records Center
NRC	National Records Center
OEW	Ordnance and Explosive Waste

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OSHA	Occupational Safety and Health Act
PA	Preliminary Assessment
PD	Point Detonating
PIBD	Point Initiating, Base Detonating
PL	Public Law
QASAS	Quality Assurance Specialist Ammunition Surveillance
RA	Removal Action
RAC	Risk Assessment Code
RD	Remedial Design
RG	Record Group
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasability Study
SARA	Superfund Amendments and Reauthorization Act
SCS	Soil Conservation Service
SLD	St. Louis District, Corps of Engineers
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
SWMU	Solid Waste Management Units
TECOM	Test Evaluation Command
TEU	Technical Escort Unit
TNT	Trinitrotoluene
TP	Target Practice
USA	United States of America
USACE	U.S. Army Corps of Engineers
USADACS	U.S. Army Defense Ammunition Center and School
USAED	U.S. Army Engineer District
USAEDH	U.S. Army Engineer Division, Huntsville, AL
USATHMA	U.S. Army, Corps of Engineers, Toxic and Hazardous Materials Agency

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USC	United States Code
USDA	U.S. Department of Army
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UXO	Unexploded Ordnance
WAA	War Assets Administration
WD	War Department
WNRC	Washington National Records Center

APPENDIX B

RISK ASSESSMENT CODE PROCEDURE FORM

18 Apr 94
Previous editions obsolete

RISK ASSESSMENT PROCEDURE FOR
ORDNANCE AND EXPLOSIVE WASTE (OEW) SITE

Site Name	MONOMOY ISLAND ARMY/ AIR FORCE GUNNERY RANGE	Rater's Name	ROCHELLE ROSS
Site Location	BARNSTABLE COUNTY, MA	Phone No.	314-331-8784
DERP Project#	D01MA024501	Organization	CELMS-PM-M
Date Completed	10 AUGUST 1995	RAC Score	5

OEW RISK ASSESSMENT:

This risk assessment procedure was developed in accordance with MIL-STD 882C and AR 385-10. The RAC score will be used by CEHND to prioritize the remedial action at Formerly Used Defense Sites. The OEW risk assessment should be based upon best available information resulting from records searches, reports of Explosive Ordnance Disposal (EOD) detachment actions, and field observations, interviews, and measurements. This information is used to assess the risk involved based upon the potential OEW hazards identified at the site. The risk assessment is composed of two factors, **hazard severity and hazard probability.** Personnel involved in visits to potential OEW sites should view the CEHND videotape entitled "A Life Threatening Encounter: OEW."

Part I. Hazard Severity. Hazard severity categories are defined to provide a qualitative measure of the worst credible mishap resulting from personnel exposure to various types and quantities of unexploded ordnance items.

TYPE OF ORDNANCE
(Circle all values that apply)

A. Conventional Ordnance and Ammunition

	VALUE
Medium/Large Caliber (20mm and larger)	10
Bombs, Explosive	10
Grenades, Hand and Rifle, Explosive	10
Landmines, Explosive	10
Rockets, Guided Missiles, Explosive	10
Detonators, Blasting Caps, Fuzes, Boosters, Bursters	6
Bombs, Practice (w/spotting charges)	6
Grenades, Practice (w/spotting charges)	4
Landmines, Practice (w/spotting charges)	4
Small Arms (.22 cal - .50 cal)	1
Conventional Ordnance and Ammunition (Select the largest single value)	0

What evidence do you have regarding conventional OEW? Although practice bombs and small arms were most likely used on site, there is no evidence any hazardous items remain.

B. Pyrotechnics (For munitions not described above)

	VALUE
Munitions (Container) containing White Phosphorus or other Pyrophoric Material (i.e., Spontaneously Flammable)	10
Munitions Containing A Flame or Incendiary Material (i.e., Napalm, Triethylaluminum Metal Incendiaries)	6
Flares, Signals, Simulators, Screening Smokes (other than WP)	4
Pyrotechnics (Select the largest single value)	0

What evidence do you have regarding pyrotechnics? Research did not uncover the use or storage of pyrotechnics on this site

C. Bulk High Explosives (Not an integral part of conventional ordnance; uncontainerized.)

	VALUE
Primary or Initiating Explosives (Lead Styphnate, Lead Azide, Nitroglycerin, Mercury Azide, Mercury Fulminate, Tetracene, etc.)	10
Demolition Charges	10
Secondary Explosives (PETN, Compositions A, B, C Tetryl, TNT, RDX, HMX, HBX, Black Powder, etc.)	8
Military Dynamite	6
Less Sensitive Explosives (Ammonium Nitrate, Explosive D, etc.)	3
High Explosives (Select the largest single value)	0

What evidence do you have regarding bulk explosives? Research did not uncover the use or storage of bulk high explosives on this site

D. Bulk Propellants (Not an integral part of rockets, guided missiles, or other conventional ordnance; uncontainerized)

	VALUE
Solid of Liquid Propellants	6
Propellants	0

What evidence do you have regarding bulk propellants? Research did not disclose the use or storage of bulk propellants

E. Chemical Warfare Materiel and Radiological Weapons

	VALUE
Toxic Chemical Agents (Choking, Nerve, Blood, Blister)	25
War Gas Identification sets	20
Radiological	15
Riot Control and Miscellaneous (Vomiting, Tear)	5
Chemical and Radiological (Select the largest single value)	0

What evidence do you have regarding chemical/radiological OEW? Research did not disclose the use of CWM on the FUDS areas.

==========

Total Hazard Severity Value
(Sum of the Largest Values for A through E--Maximum of 61) 0
Apply this value to Table 1 to determine Hazard Severity Category.

TABLE 1

HAZARD SEVERITY*

Description	Category	Hazard Severity Value
CATASTROPHIC	I	21 and greater
CRITICAL	II	10 to 20
MARGINAL	III	5 to 9
NEGLIGIBLE	IV	1 to 4
**NONE		0

*** Apply Hazard Severity Category to Table 3**

**If Hazard Severity Value is 0, you do not need to complete Part II. Proceed to Part III and use a RAC Score of 5 to determine your appropriate action.

Part II. Hazard Probability. The probability that a hazard has been or will be created due to the presence and other rated factors of unexploded ordnance or explosive materials on a formerly used DOD site.

AREA, EXTENT, ACCESSIBILITY OF OEW HAZARD
(Circle all values that apply)

A. Location of OEW Hazards

	VALUE
On the surface	5
Within Tanks, Pipes, Vessels or Other confined locations	4
Inside walls, ceilings, or other parts of Buildings and Structures	3
Subsurface	2
Location (Select the single largest value)	___

What evidence do you have regarding location of OEW? _____

_____

B. Distance to nearest inhabited locations or structures likely to be at risk from OEW hazard (roads, playgrounds, and buildings).

	VALUE
Less than 1250 feet	5
1250 feet to 0.5 miles	4
0.5 miles to 1.0 miles	3
1.0 miles to 2.0 miles	2
Over 2 miles	1
Distance (Select the single largest value)	___

What are the nearest inhabited structures? _____

_____

C. Numbers of buildings within a 2 mile radius measured from the OEW hazard area, not the installation boundary.

	VALUE
26 and over	5
16 to 25	4
11 to 15	3
6 to 10	2
1 to 5	1
0	0

Number of Buildings (Select the single largest value) ___

Narrative _____

_____

D. Types of Buildings (within a 2 mile radius)

	VALUE
Educational, Child Care, Residential, Hospitals, Hotels, Commercial, Shopping Centers	5
Industrial, Warehouse, etc.	4
Agricultural, Forestry, etc.	3
Detention, Correctional	2
No Buildings	0

Types of Buildings (Select the largest single value) ___

Describe types of buildings in the area. _____

_____

E. Accessibility to site refers to access by humans to ordnance and explosive wastes. Use the following guidance:

BARRIER	VALUE
No barrier or security system	5
Barrier is incomplete (e.g. in disrepair or does not completely surround the site). Barrier is intended to deny egress from the site, as for a barbed wire fence for grazing.	4
A barrier, (any kind of fence in good repair) but no separate means to control entry. Barrier is intended to deny access to the site.	3
Security guard, but no barrier	2
Isolated site	1
A 24-hour surveillance system (e.g., television monitoring or surveillance by guards or facility personnel) which continuously monitors and controls entry onto the facility; or An artificial or natural barrier (e.g., a fence combined with a cliff), which completely surrounds the facility; and a means to control entry, at all times, through the gates, or other entrances to the facility (e.g., an attendant, television monitors, locked entrances, or controlled roadway access to the facility).	0

Accessibility (Select the single largest value) ____

Describe the site accessibility. _____

_____

F. Site Dynamics - This deals with site conditions that are subject to change in the future, but may be stable at the present. Examples would be excessive soil erosion by beaches or streams, increasing land development that could reduce distances from the site to inhabited areas or otherwise increase accessibility.

	VALUE
Expected	5
None Anticipated	0

Site Dynamics (Select largest value) ____

Describe the site dynamics. _____

_____

Total Hazard Probability Value
(Sum of Largest Values for A through F--Maximum of 30) _____

Apply this value to Hazard Probability Table 2 to determine Hazard Probability Level.

TABLE 2

HAZARD PROBABILITY

Description	Level	Hazard Probability Value
FREQUENT	A	27 or greater
PROBABLE	B	21 to 26
OCCASIONAL	C	15 to 20
REMOTE	D	8 to 14
IMPROBABLE	E	less than 8

*** Apply Hazard Probability Level to Table 3.**

Part III. Risk Assessment. The risk assessment value for this site is determined using the following Table 3. Enter with the results of the hazard probability and hazard severity values.

TABLE 3

Probability Level		FREQUENT A	PROBABLE B	OCCASIONAL C	REMOTE D	IMPROBABLE E
Severity Category:						
CATASTROPHIC	I	1	1	2	3	4
CRITICAL	II	1	2	3	4	5
MARGINAL	III	2	3	4	4	5
NEGLIGIBLE	IV	3	4	4	5	5

RISK ASSESSMENT CODE (RAC)

RAC 1 Expedite INPR, recommending further action by CEHND - Immediately call CEHND-ED-SY--commercial (205) 955-4968 or DSN 645-4968.

RAC 2 High priority on completion of INPR - Recommend further action by CEHND.

RAC 3 Complete INPR - Recommend further action by CEHND.

RAC 4 Complete INPR - Recommend further action by CEHND.

(RAC 5) Usually indicates that no further action (NOFA) is necessary. Submit NOFA and RAC to CEHND.

Part IV. Narrative. Summarize the documented evidence that supports this risk assessment. If no documented evidence was available, explain all the assumptions that you made.

See ASR for further discussion.

APPENDIX C

REPORT DISTRIBUTION LIST

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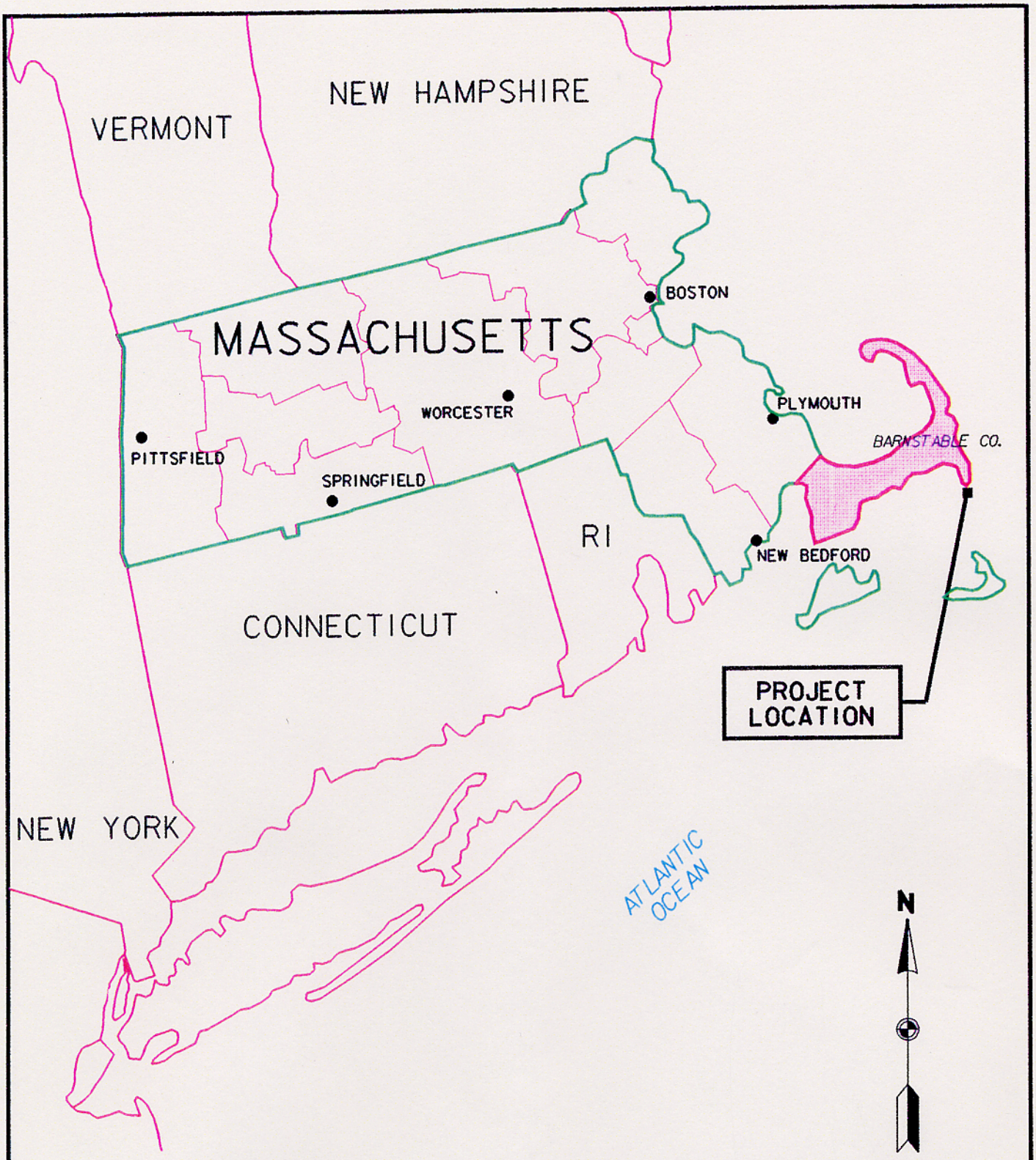
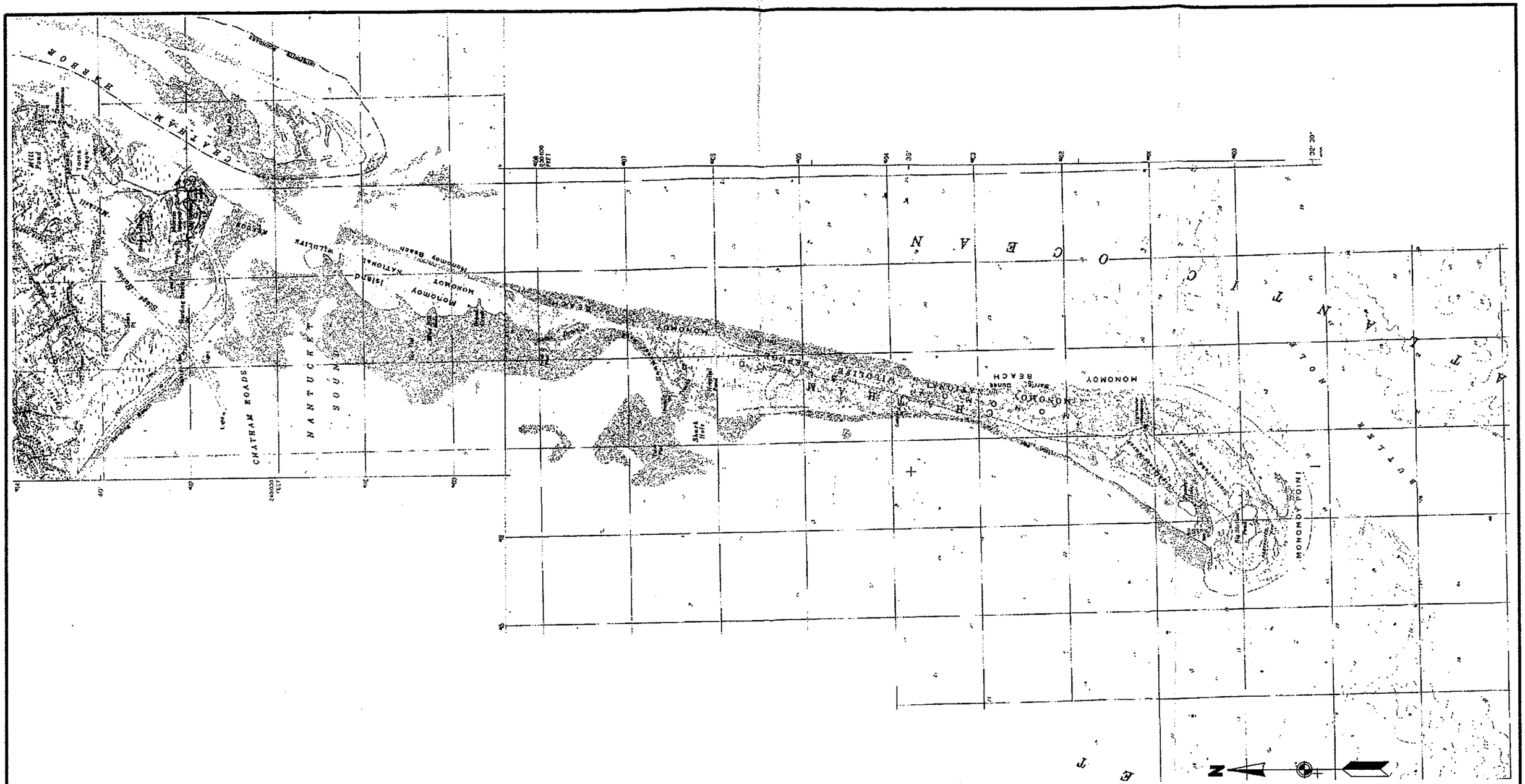


PLATE 1

MONOMOY ISLAND ARMY/ AIR FORCE GUNNERY RANGE MONOMOY ISLAND, MASSACHUSETTS BARNSTABLE COUNTY DERP-FUDS# D01MA024501 PROJECT LOCATION MAP

NOT TO SCALE

PROJECT DATE: JUNE 1995	DATE OF MAP: 1995
10-JUL-1995 15:59	/n/oew95c/r30/map/monoloc.dgn



NOT TO SCALE

PLATE 2

MONOMOY ISLAND ARMY/ AIR FORCE GUNNERY RANGE MONOMOY ISLAND, MASSACHUSETTS DERP-FUDS* D01MA024501 VICINITY MAP

PROJ. DATE: JUNE 1995	DATE OF QUAD: 1974
10-JUL-1995 12:30	/n/ow95c/r30/quad/mono7400.dgn & .clt

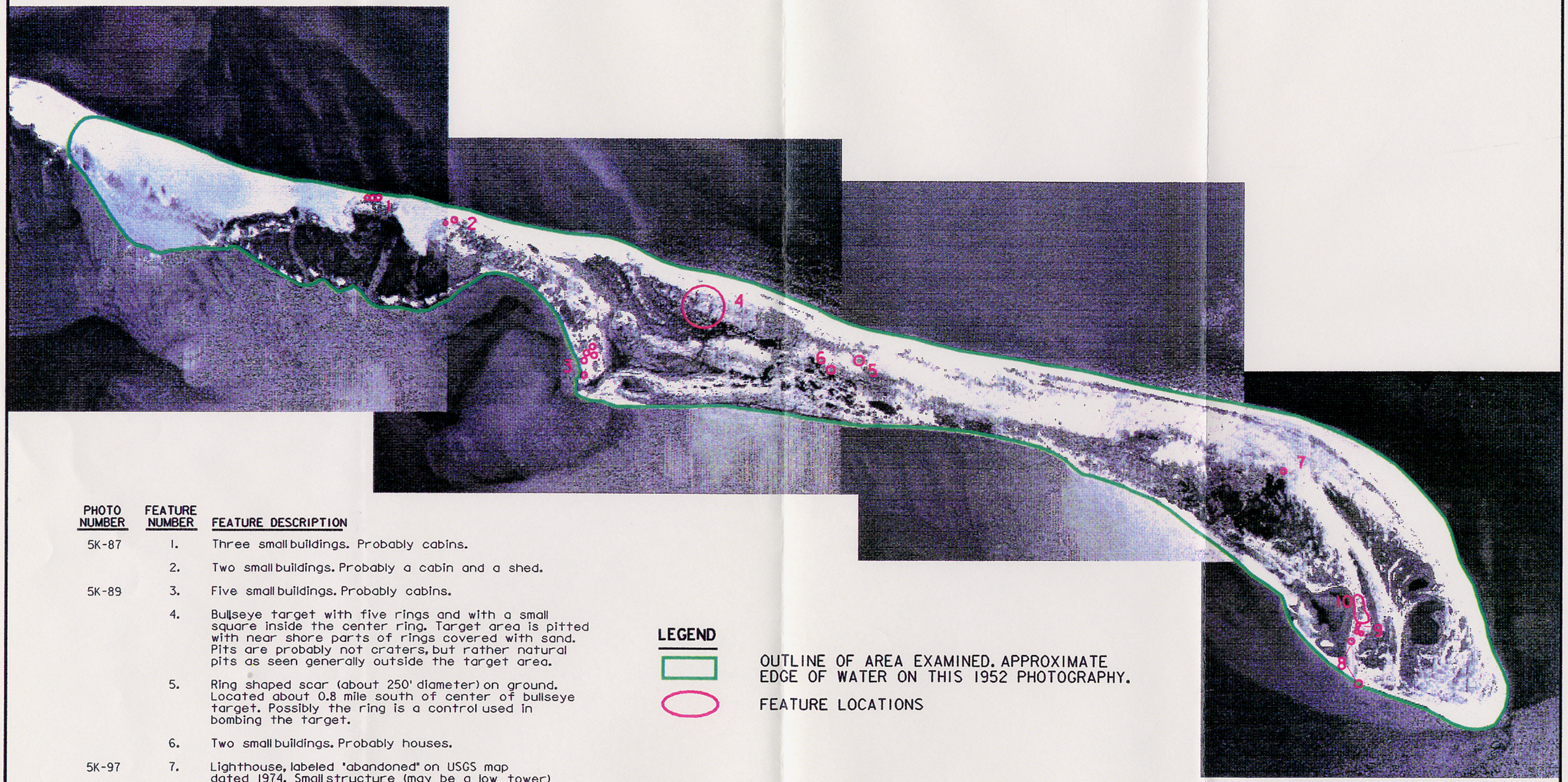


PHOTO NUMBER	FEATURE NUMBER	FEATURE DESCRIPTION
5K-87	1.	Three small buildings. Probably cabins.
	2.	Two small buildings. Probably a cabin and a shed.
5K-89	3.	Five small buildings. Probably cabins.
	4.	Bullseye target with five rings and with a small square inside the center ring. Target area is pitted with near shore parts of rings covered with sand. Pits are probably not craters, but rather natural pits as seen generally outside the target area.
	5.	Ring shaped scar (about 250' diameter) on ground. Located about 0.8 mile south of center of bullseye target. Possibly the ring is a control used in bombing the target.
	6.	Two small buildings. Probably houses.
5K-97	7.	Lighthouse, labeled "abandoned" on USGS map dated 1974. Small structure (may be a low tower) located about 200 feet northwest of the lighthouse.
	8.	Two small buildings. Probably cabins.
	9.	Two large two story buildings and one smaller building. Probably two houses and a garage.
	10.	Area with about ten small buildings. Probably cabins.

LEGEND

OUTLINE OF AREA EXAMINED. APPROXIMATE EDGE OF WATER ON THIS 1952 PHOTOGRAPHY.

FEATURE LOCATIONS

N

NOT TO SCALE

PLATE 3

MONOMOY ISLAND ARMY/
AIR FORCE GUNNERY RANGE
MONOMOY ISLAND MASSACHUSETTS
BARNSTABLE COUNTY
DERP-FUDS# D01MA024501
AERIAL PHOTO INTERPRETATION
1952 PHOTOGRAPHY

PROJ. DATE: JUNE 1995	DATE OF PHOTO: 25 JULY 1952
10-JUL-1995 13:25	N:/OEW95C/R30/PHOTO/MON05201.DGN & .VBB

PHOTO NUMBER	FEATURE NUMBER	FEATURE DESCRIPTION
290-046	1.	FIVE SMALL BUILDINGS. PROBABLY CABINS.
	2.	BULLSEYE TARGET. PARTS OF OUTER TWO RINGS ONLY SEEN.
290-044	3.	LIGHTHOUSE. LABELED "ABANDONED" ON USGS MAP DATED 1974. SMALL STRUCTURE (MAYBE A LOW TOWER) LOCATED ABOUT 200' NORTHEAST OF THE LIGHTHOUSE.
	4.	TWO LARGE TWO STORY BUILDINGS AND ONE SMALL BUILDING. PROBABLY TWO HOUSES AND A GARAGE.
	5.	ONE SMALL BUILDING. PROBABLY A CABIN.
	6.	AREA WITH SEVERAL SMALL BUILDINGS. PROBABLY CABINS.

LEGEND

OUTLINE OF AREA EXAMINED. APPROXIMATE EDGE OF WATER ON THIS 1963 PHOTOGRAPHY.

FEATURE LOCATION

N

NOT TO SCALE

PLATE 4

MONOMOY ISLAND ARMY/
AIR FORCE GUNNERY RANGE
MONOMOY ISLAND, MASSACHUSETTS
BARNSTABLE COUNTY
DERP-FUDS# DMOIMA024501
AERIAL PHOTO INTERPRETATION
1963 PHOTOGRAPHY

PROJ. DATE: JUNE 1995	DATE OF PHOTO: 31 JULY 1963
12-JUL-1995 08:26	N:/OEW95C/R30/PHOTO/MON06301.DGN & 630A,B,C,D.EXT

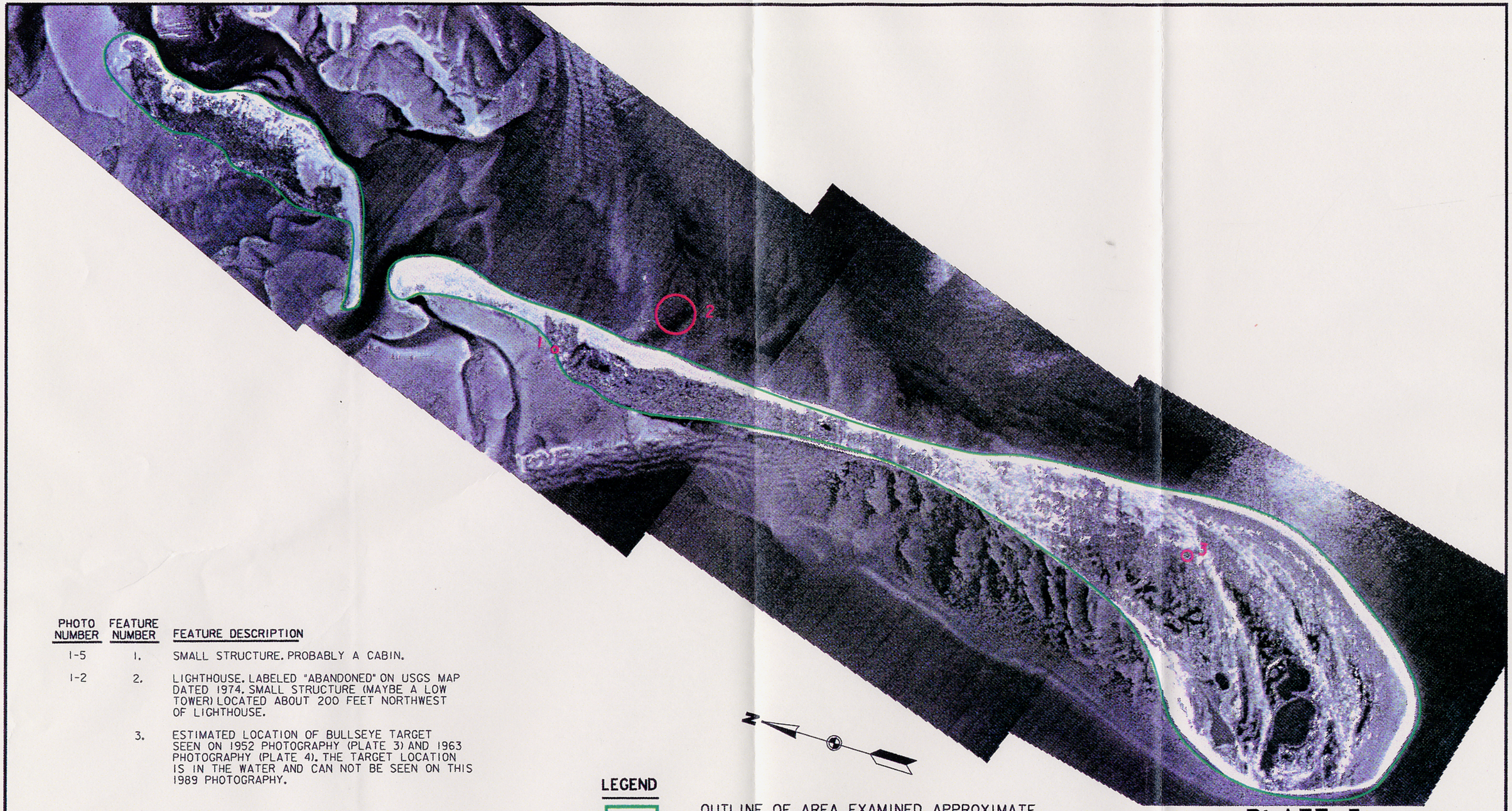


PHOTO NUMBER	FEATURE NUMBER	FEATURE DESCRIPTION
1-5	1.	SMALL STRUCTURE. PROBABLY A CABIN.
1-2	2.	LIGHTHOUSE. LABELED "ABANDONED" ON USGS MAP DATED 1974. SMALL STRUCTURE (MAYBE A LOW TOWER) LOCATED ABOUT 200 FEET NORTHWEST OF LIGHTHOUSE.
	3.	ESTIMATED LOCATION OF BULLSEYE TARGET SEEN ON 1952 PHOTOGRAPHY (PLATE 3) AND 1963 PHOTOGRAPHY (PLATE 4). THE TARGET LOCATION IS IN THE WATER AND CAN NOT BE SEEN ON THIS 1989 PHOTOGRAPHY.

LEGEND

OUTLINE OF AREA EXAMINED. APPROXIMATE EDGE OF WATER ON THIS 1989 PHOTOGRAPHY.

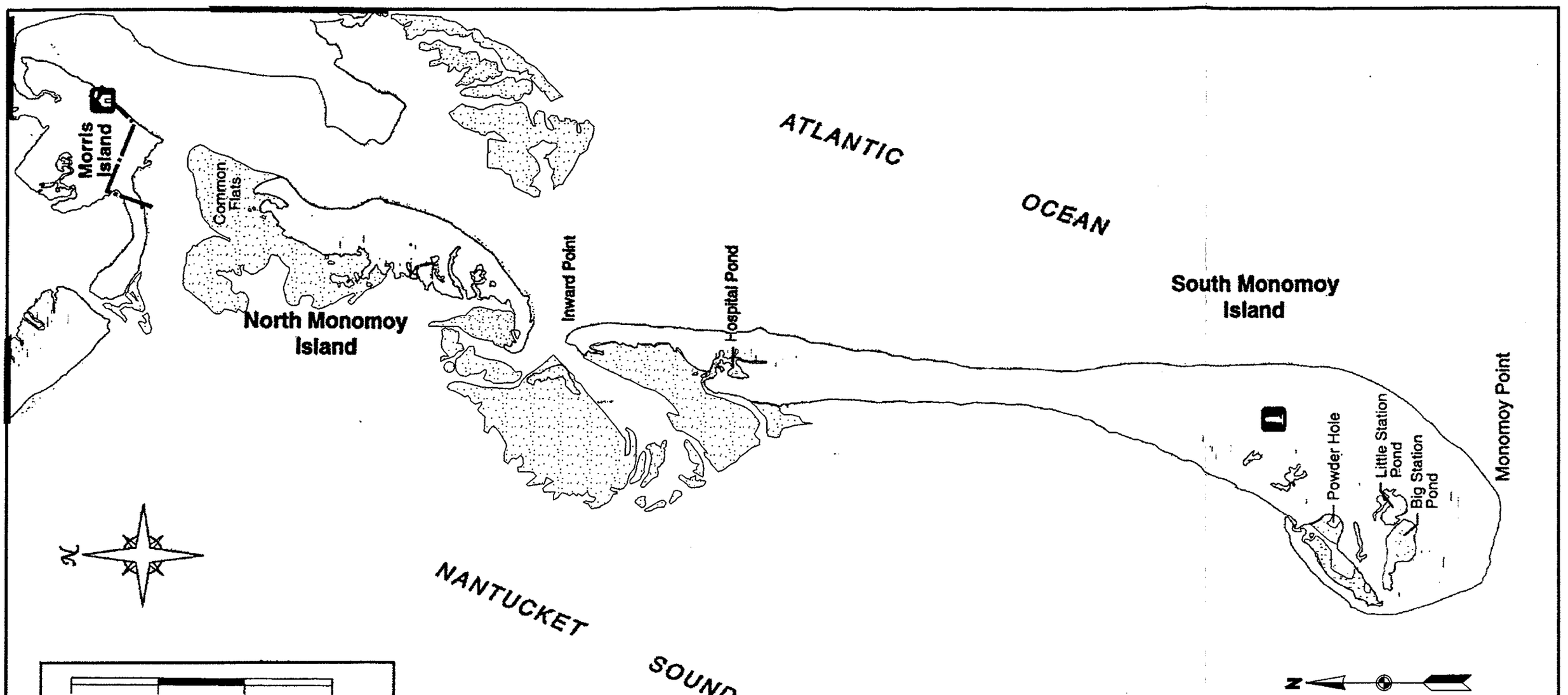
FEATURE LOCATION

NOT TO SCALE

PLATE 5

MONOMOY ISLAND ARMY/
AIR FORCE GUNNERY RANGE
MONOMOY ISLAND, MASSACHUSETTS
BARNSTABLE COUNTY
DERP-FUDS# D01MA024501
AERIAL PHOTO INTERPRETATION
1989 PHOTOGRAPHY

PROJ. DATE: JUN 1995	DATE OF PHOTO: 23 MAY 1989
12-JUL-1995 15:02	/N/OEW95C/F30/PHOTO/MON0890I.DGN & MON0890A,B,C,D.EXT

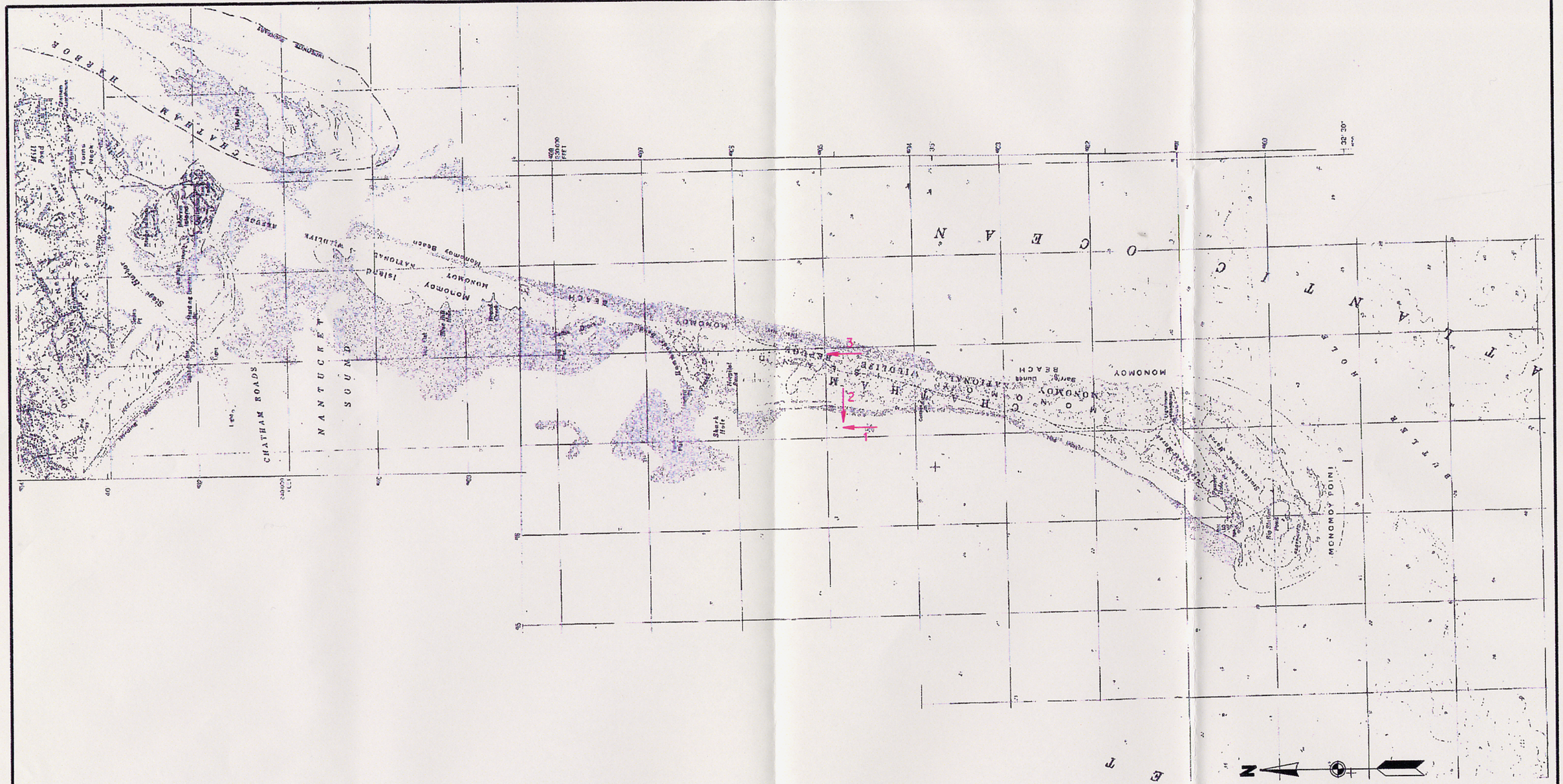


NOT TO SCALE

PLATE 6

MONOMOY ISLAND ARMY/ AIR FORCE GUNNERY RANGE MONOMOY ISLAND, MASSACHUSETTS DERP-FUDS* D01MA024501 CURRENT USE MAP

PROJ. DATE: JUNE 1995	DATE OF MAP: SEPTEMBER 1993
10-JUL-1995 13:45	/n/oe95c/r30/map/lmoycur.dgn & .clt



NOT TO SCALE

PLATE 7

MONOMOY ISLAND ARMY/ AIR FORCE GUNNERY RANGE MONOMOY ISLAND, MASSACHUSETTS DERP-FUDS* DOIMA024501 PHOTO LOCATIONS

PROJ. DATE: JUNE 1995	DATE OF QUAD: 1974
10-JUL-1995 14:31	/n/ow95c/r30/quad/7400mono.dgn & .clt